AIR AND RADIATION DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

DATE: May 13, 1997

SUBJECT: Review of data on limestone wall and ComEd vault, Lindsay Light II Site, Chicago, Illinois

FROM: Larry Jensen, CHP
Regional Radiation Expert
Radiation and Indoor Air Section

TO: Fred Micke, On-Scene Coordinator
Emergency and Enforcement Response Branch
Response Section III

I have reviewed the data sent to you by J.D. White of the Kerr-McGee Chemical Corporation on May 7, 1997, and by Bernie Bono representing Kerr-McGee Chemical Corporation on an unspecified date. The data covered gamma scans and soil concentrations estimated by gamma count rate.

The gamma scan data taken on February 5, 1997, is of little value in making a decision on the contamination of the limestone block wall. This data represents area averages over 4 square meter sections of the wall. Area averages could obscure the real problem, which could be with the soil in the gaps between the blocks. This soil could be contaminated to levels we would want removed, but, with area averaging over uncontaminated limestone block, would meet our cleanup criterion.

Data was taken on soil concentrations in sites on the limestone block wall. Before discussing the results and interpreting this, let me give some background on the precision of the data.

I have used the Kerr-McGee standard sources at their West Chicago, Illinois, site to calibrate a narrow sodium iodide pipe monitor. This monitor is made by the same manufacturer as the one Kerr-McGee is using and is the same model as well. Count rates were obtained for three low concentrations, fitted to a statistically "best-fit" line and then the soil concentration estimated from the "best-fit" line for each standard. This method would give some indication of how good the "best-fit" line is in estimating soil concentrations from count rate.

The estimations vary from the standard values at the lowest concentrations. Specifically, my estimation was 3.9 picocuries per gram (pCi/g) when the standard was 1.7 pCi/g, was 9.8 pCi/g when the standard was 12.9 pCi/g, and was 24.3 pCi/g when the standard was 23.4 pCi/g. The import I read into this is that at low concentrations (under 20 pCi/g) the estimated soil concentration could be 2 or 3 pCi/g above or below the "true" soil concentration. Data sent to us by Kerr-McGee will be interpreted with this in mind.

Of the 10 soil samples taken on the limestone block wall, none exceeds 7.1 pCi/g, the cleanup criterion. If allowance is made for variation in estimation, site T-1 in the upper left corner could exceed the soil criterion (it might be as high as 8 pCi/g instead of 5 pCi/g)

For the ComEd vault, none of the seven floor samples exceeded the cleanup criterion. If allowance is made for variation in estimation, two sites would come close to the criterion (about 7.0 pCi/g compared to a criterion of 7.1 pCi/g). All of the peak values for the seven holes are at the surface layer, 0.5 feet below the floor. This might explain the elevated values we saw at the base of the vault when we measured from the outside.

When I reviewed the data for the walls of the ComEd vault, half of the 8 values exceeded the soil criterion without any allowance for estimation errors. The highest concentration was 16.3 pCi/g compared to the cleanup criterion of 7.1 pCi/g. Allowing for estimation, by adding 3 pCi/g, then all but one of the 8 would exceed the criterion. Peak elevated values were 1 to 3 feet behind the wall. For the top tier of measurements, there was a regular increase from east to west (2.0 pCi/g to 5.6 to 6.1 to 16.3). The bottom tier had elevated values but they were not regular.

My conclusions after this reveiw is that the data does not support contamination in the limestone block wall but that the data does support contamination behind the vertical walls of the ComEd vault. This contamination seems to increase from east to west.

Also, it should be recalled that further east from these sites pipes running under Illinois Street are exposed. Kerr-McGee has stated that these are contaminated, either within or surrounding the pipes, for an unknown distance into Illinois Street. This might support data showing contamination under Illinois Street.